Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled data based on original data using

LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: INVUE

Report Number: P672040

Luminaire Tested: **CCP-SA-2C-840-U-AFL**

Issue Date: 04/16/2023

Report Generated By 670245763

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P672040 |
| Test Lab: | INNOVATION CENTER(G2) |
| Issue Date: | 04/16/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | CCP-SA-2C-840-U-AFL |
| Description: | INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @615mA w/ AFL distribution lens |
| Light Source: | (32) 4000K CCT, 80 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 7779.4 lumens |
| Efficiency: | N/A |
| Efficacy: | 125.3 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 62.1 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 25 FT |

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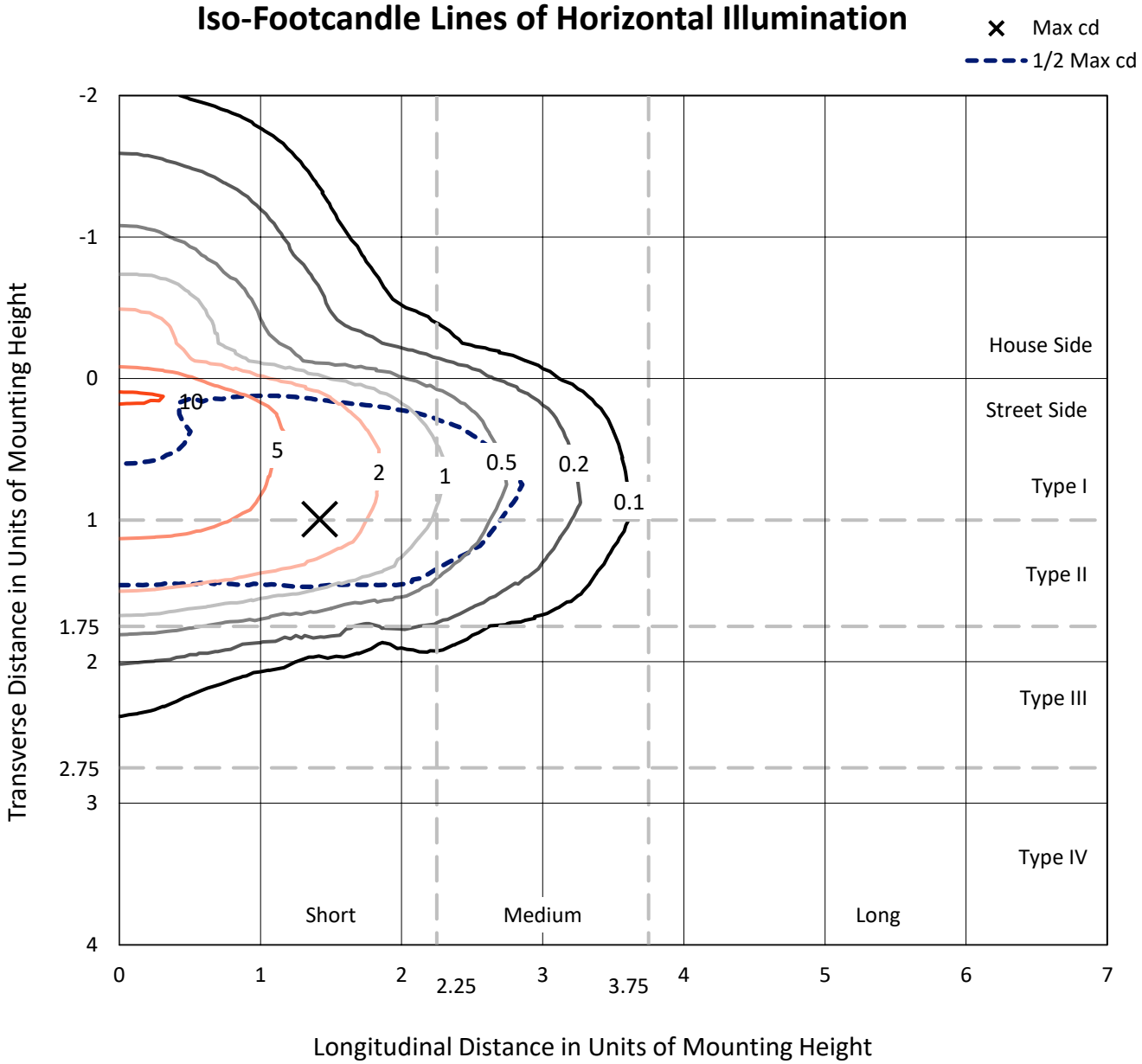
REPORT NUMBER: P672040
CATALOG NUMBER: CCP-SA-2C-840-U-AFL

## Iso-Footcandle Lines of Horizontal Illumination




Based on 15 foot mounting height. Maximum calculated value = 10.8 fc
Type II - Short - N/A

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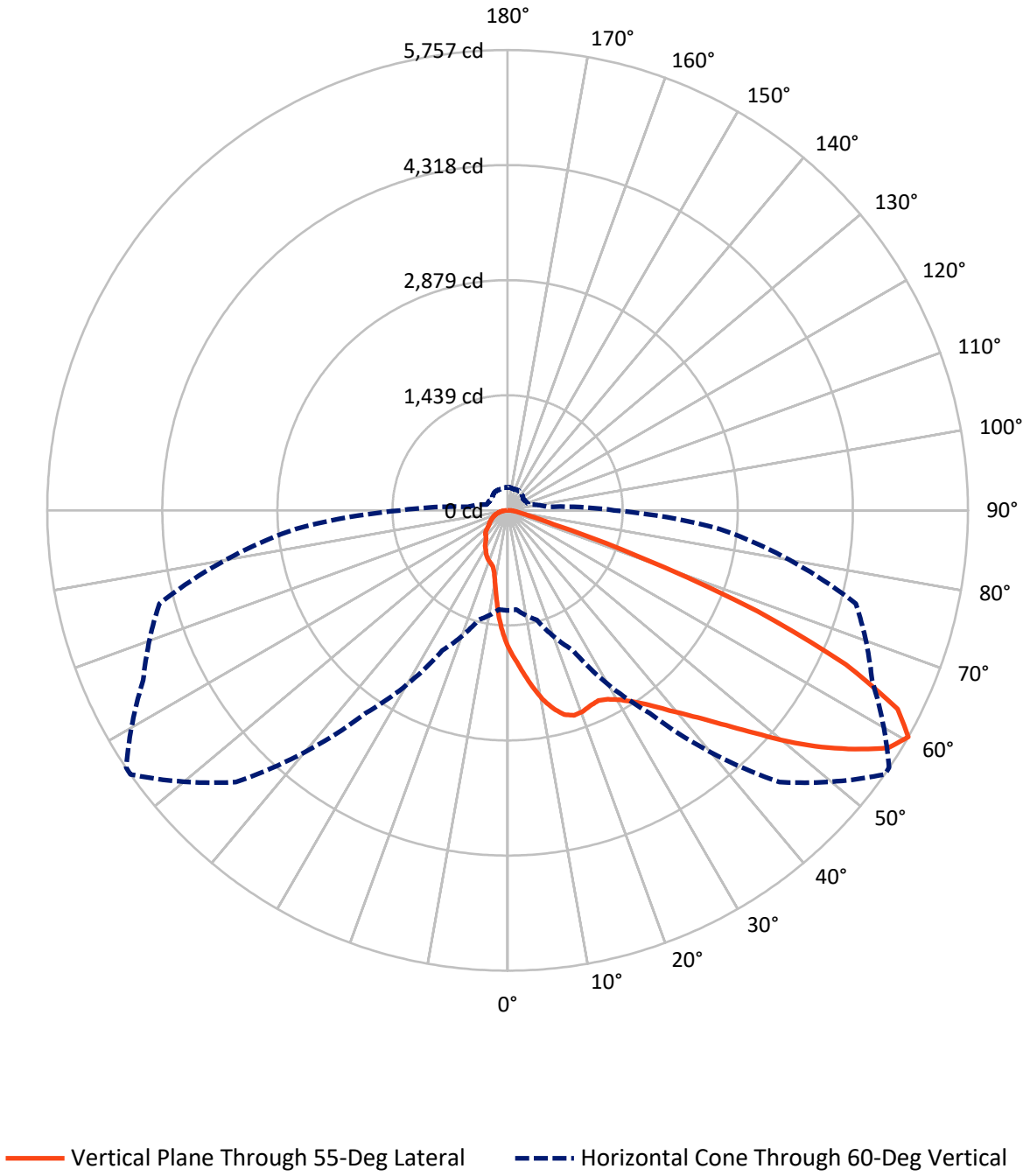
CATALOG NUMBER: CCP-SA-2C-840-U-AFL

## Luminous Intensity Polar Plot



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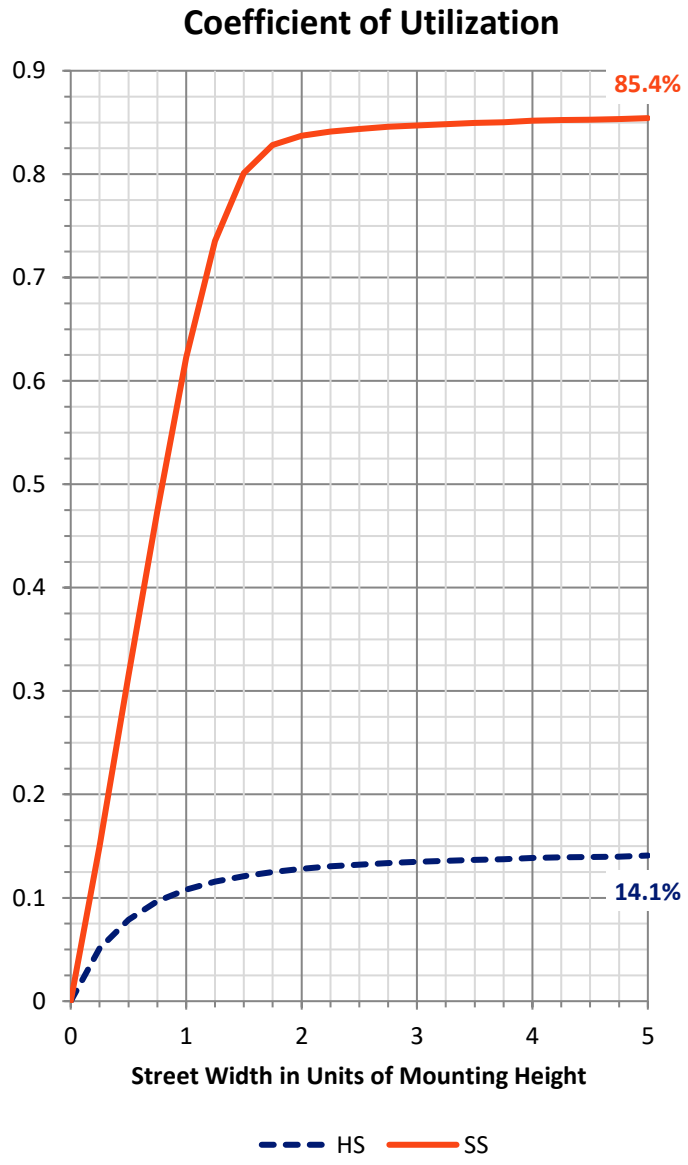
REPORT NUMBER: P672040
CATALOG NUMBER: CCP-SA-2C-840-U-AFL

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1118.3 | 0.0 | 1118.3 |
| | % Fixture | 14.4 | 0.0 | 14.4 |
| **Street Side** | Lumens | 6661.0 | 0.0 | 6661.0 |
| | % Fixture | 85.6 | 0.0 | 85.6 |
| **Total** | Lumens | 7779.4 | 0.0 | 7779.4 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 161.5 | 2.1 |
| 10°-20° | 457.4 | 5.9 |
| 20°-30° | 744.8 | 9.6 |
| 30°-40° | 1113.2 | 14.3 |
| 40°-50° | 1636.1 | 21.0 |
| 50°-60° | 1917.6 | 24.6 |
| 60°-70° | 1264.4 | 16.3 |
| 70°-80° | 402.6 | 5.2 |
| 80°-90° | 81.9 | 1.1 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 7779.4 | 100.0 |
| 0°-180° | 7779.4 | 100.0 |



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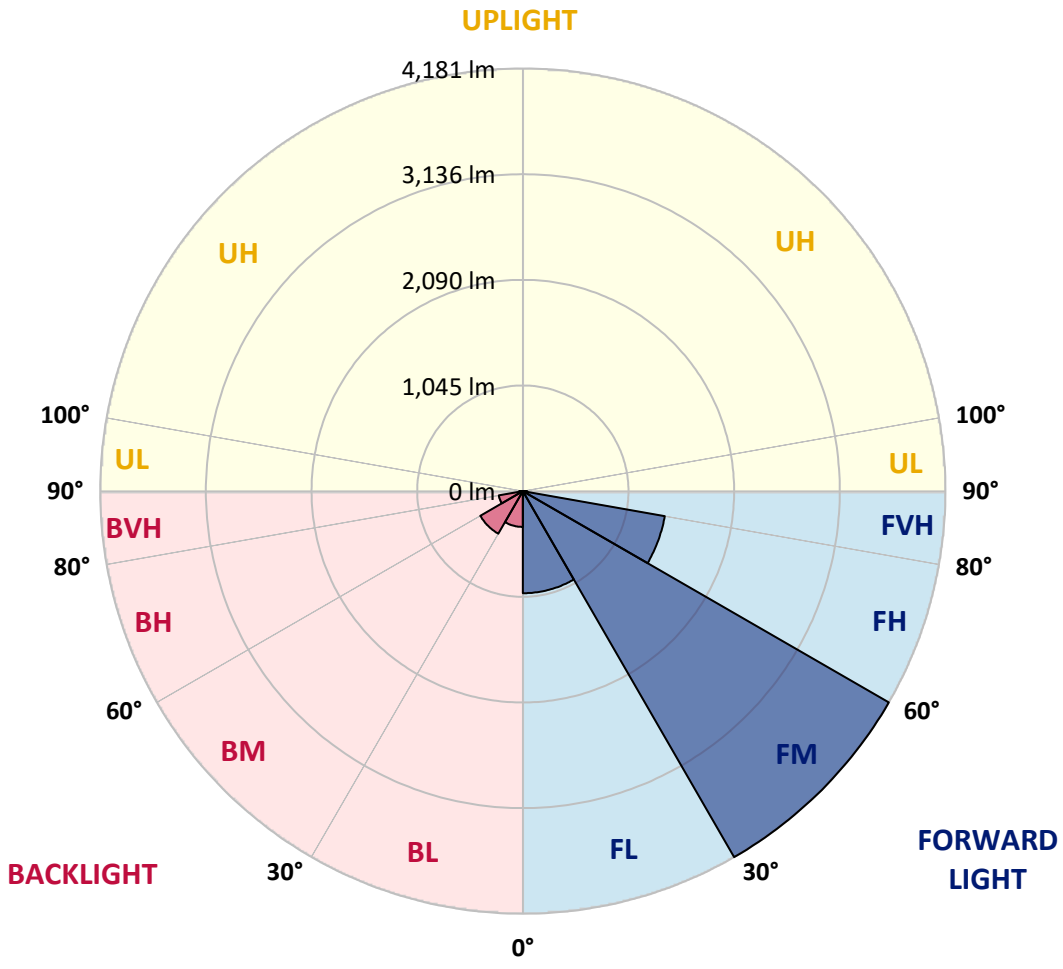
REPORT NUMBER: P672040
CATALOG NUMBER: CCP-SA-2C-840-U-AFL

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1009.7 | 13.0 | | | |
| FM | (30°-60°) | 4180.8 | 53.7 | | | |
| FH | (60°-80°) | 1425.7 | 18.3 | | | G1/1800 |
| FVH | (80°-90°) | 44.9 | 0.6 | | | G1/100 |
| BL | (0°-30°) | 354.0 | 4.6 | B1/500 | | |
| BM | (30°-60°) | 486.1 | 6.2 | B1/1000 | | |
| BH | (60°-80°) | 241.3 | 3.1 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 37.0 | 0.5 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G1**
Type II Short



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 56° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | *1725.3* | 1725.3 | 1725.3 | 1725.3 | 1725.3 |
| 2.5° | 2007.8 | 2000.4 | 2000.4 | 1981.8 | 1954.2 | 1915.9 | *1870.2* | 1858.9 | 1841.4 | 1796.9 | 1739.4 |
| 5° | 2313.9 | 2306.0 | 2295.3 | 2262.6 | 2211.3 | 2134.6 | *2038.2* | 2020.7 | 1958.1 | 1866.2 | 1762.5 |
| 7.5° | 2516.3 | 2511.8 | 2508.4 | 2480.2 | 2429.5 | 2353.9 | *2224.8* | 2205.1 | 2099.1 | 1946.9 | 1784.5 |
| 10° | 2495.5 | 2509.0 | 2532.7 | 2552.4 | 2562.6 | 2523.7 | *2402.4* | 2379.3 | 2247.9 | 2040.5 | 1817.2 |
| 12.5° | 2299.8 | 2319.0 | 2363.0 | 2443.6 | 2536.6 | 2611.6 | *2542.8* | 2529.9 | 2406.9 | 2139.7 | 1858.3 |
| 15° | 2154.4 | 2162.2 | 2183.7 | 2243.4 | 2382.1 | 2582.3 | *2651.6* | 2639.8 | 2555.2 | 2267.1 | 1905.7 |
| 17.5° | 2109.2 | 2112.6 | 2117.7 | 2137.4 | 2232.2 | 2467.8 | *2696.2* | 2707.5 | 2699.0 | 2399.6 | 1959.3 |
| 20° | 2131.8 | 2134.1 | 2134.6 | 2138.0 | 2183.1 | 2372.0 | *2684.3* | 2703.5 | 2825.3 | 2532.1 | 2012.3 |
| 22.5° | 2218.6 | 2215.8 | 2211.9 | 2198.9 | 2224.3 | 2355.1 | *2652.8* | 2683.2 | 2922.8 | 2652.8 | 2061.3 |
| 25° | 2370.3 | 2366.3 | 2338.7 | 2311.7 | 2322.4 | 2416.0 | *2635.9* | 2668.6 | 2999.0 | 2766.7 | 2097.4 |
| 27.5° | 2550.7 | 2546.8 | 2518.6 | 2467.3 | 2456.0 | 2517.4 | *2675.3* | 2695.6 | 3054.8 | 2867.6 | 2113.2 |
| 30° | 2737.9 | 2737.9 | 2702.9 | 2643.7 | 2607.7 | 2633.6 | *2748.1* | 2764.4 | 3097.1 | 2965.1 | 2123.3 |
| 32.5° | 2942.0 | 2947.6 | 2893.5 | 2825.9 | 2785.8 | 2770.6 | *2850.1* | 2864.2 | 3158.5 | 3080.1 | 2144.8 |
| 35° | 3204.2 | 3191.8 | 3125.8 | 3036.7 | 2972.5 | 2938.1 | *2976.4* | 2992.7 | 3248.7 | 3223.4 | 2179.2 |
| 37.5° | 3499.1 | 3477.1 | 3395.9 | 3289.3 | 3177.1 | 3119.6 | *3145.0* | 3148.9 | 3382.3 | 3410.0 | 2241.7 |
| 40° | 3742.6 | 3738.7 | 3669.9 | 3569.0 | 3427.5 | 3350.2 | *3337.8* | 3340.1 | 3567.8 | 3631.0 | 2336.5 |
| 42.5° | 3947.9 | 3933.2 | 3920.8 | 3885.3 | 3735.3 | 3608.4 | *3557.7* | 3558.3 | 3769.1 | 3859.3 | 2431.7 |
| 45° | 4038.6 | 4035.8 | 4072.5 | 4163.8 | 4056.1 | 3906.7 | *3834.5* | 3844.7 | 3999.7 | 4093.9 | 2523.7 |
| 47.5° | 3999.7 | 4002.0 | 4100.1 | 4339.7 | 4403.4 | 4289.0 | *4161.0* | 4154.8 | 4223.0 | 4273.7 | 2604.8 |
| 50° | 3652.4 | 3689.1 | 3954.6 | 4356.1 | 4631.2 | 4688.2 | *4543.8* | 4520.7 | 4418.6 | 4417.0 | 2654.5 |
| 52.5° | 3390.2 | 3388.5 | 3551.5 | 4189.7 | 4711.8 | 5048.4 | *4918.8* | 4866.9 | 4580.5 | 4497.6 | 2658.4 |
| 55° | 3036.2 | 3033.9 | 3155.1 | 3703.2 | 4551.7 | 5299.9 | *5272.3* | 5207.4 | 4728.7 | 4524.1 | 2631.3 |
| 57.5° | 2299.3 | 2342.1 | 2462.8 | 2964.6 | 4044.3 | 5259.9 | *5610.0* | 5555.9 | 4873.6 | 4512.2 | 2626.3 |
| 60° | *1251.1* | *1246.0* | *1420.8* | *1932.2* | *3096.5* | *4805.4* | *5757.2* | *5754.3* | *5027.6* | *4507.7* | *2657.3* |
| 62.5° | 576.8 | 571.1 | 606.1 | 860.4 | 1775.5 | 3849.8 | *5473.0* | 5513.6 | 5170.2 | 4466.6 | 2654.5 |
| 65° | 431.3 | 416.7 | 369.3 | 400.3 | 679.4 | 2298.1 | *4648.7* | 4756.9 | 4950.3 | 4297.4 | 2531.5 |
| 67.5° | 384.5 | 370.4 | 315.2 | 295.4 | 341.1 | 810.8 | *3372.2* | 3472.0 | 4139.6 | 3980.6 | 2332.5 |
| 70° | 352.4 | 340.0 | 284.7 | 253.7 | 256.0 | 359.2 | *1765.3* | 1961.5 | 3033.9 | 3322.0 | 1988.0 |
| 72.5° | 321.4 | 310.7 | 260.5 | 223.3 | 215.4 | 237.4 | *601.6* | 725.6 | 1887.1 | 2421.0 | 1482.3 |
| 75° | 288.7 | 278.5 | 234.5 | 200.2 | 184.9 | 175.9 | *286.4* | 308.4 | 998.0 | 1336.8 | 795.5 |
| 77.5° | 250.9 | 245.3 | 209.2 | 176.5 | 163.5 | 133.1 | *190.6* | 200.2 | 427.4 | 524.9 | 378.9 |
| 80° | 218.2 | 213.7 | 186.6 | 160.1 | 146.6 | 102.6 | *131.4* | 138.1 | 210.9 | 262.2 | 212.0 |
| 82.5° | 142.1 | 153.4 | 154.5 | 137.6 | 129.1 | 82.3 | *86.8* | 91.9 | 139.8 | 154.5 | 92.5 |
| 85° | 58.6 | 71.0 | 106.6 | 94.7 | 89.6 | 69.9 | *57.5* | 58.6 | 85.7 | 90.2 | 33.3 |
| 87.5° | 26.5 | 29.3 | 52.4 | 53.0 | 46.2 | 26.5 | *28.8* | 31.6 | 44.0 | 43.4 | 14.7 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P672040
CATALOG NUMBER: CCP-SA-2C-840-U-AFL

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 | 1725.3 |
| 2.5° | 1723.6 | 1697.7 | 1651.4 | 1592.2 | 1549.9 | 1518.9 | 1485.1 | 1460.3 | 1432.7 | 1408.4 | 1412.4 |
| 5° | 1719.6 | 1669.5 | 1565.7 | 1455.8 | 1348.7 | 1260.7 | 1187.4 | 1133.3 | 1077.5 | 1055.5 | 1052.6 |
| 7.5° | 1723.0 | 1637.9 | 1467.6 | 1287.8 | 1124.8 | 1012.6 | 927.5 | 876.2 | 844.0 | 825.4 | 826.6 |
| 10° | 1721.9 | 1608.0 | 1361.6 | 1113.5 | 935.4 | 832.8 | 780.9 | 764.0 | 761.2 | 763.4 | 766.8 |
| 12.5° | 1723.6 | 1567.4 | 1242.7 | 956.8 | 799.5 | 747.1 | 749.3 | 764.5 | 774.1 | 780.3 | 784.3 |
| 15° | 1730.9 | 1534.2 | 1120.9 | 833.3 | 728.5 | 730.1 | 754.4 | 778.1 | 792.2 | 798.9 | 802.3 |
| 17.5° | 1741.6 | 1492.4 | 1012.6 | 739.7 | 698.6 | 724.5 | 756.1 | 781.5 | 792.2 | 796.1 | 798.9 |
| 20° | 1742.8 | 1444.5 | 903.2 | 675.5 | 678.8 | 712.7 | 740.3 | 760.6 | 774.1 | 778.6 | 780.9 |
| 22.5° | 1737.7 | 1379.7 | 791.0 | 628.7 | 656.3 | 690.1 | 713.8 | 736.9 | 718.9 | 704.2 | 700.3 |
| 25° | 1716.3 | 1297.9 | 695.2 | 590.3 | 628.1 | 659.7 | 686.7 | 661.4 | 652.9 | 641.6 | 642.8 |
| 27.5° | 1670.0 | 1195.9 | 605.0 | 554.2 | 594.8 | 639.9 | 620.2 | 616.8 | 606.1 | 594.8 | 594.8 |
| 30° | 1609.1 | 1088.2 | 529.4 | 516.5 | 554.8 | 577.4 | 581.9 | 576.8 | 570.6 | 555.9 | 557.1 |
| 32.5° | 1554.4 | 974.3 | 475.9 | 484.9 | 529.4 | 529.4 | 549.2 | 549.2 | 526.6 | 485.4 | 485.4 |
| 35° | 1500.3 | 867.2 | 436.4 | 458.4 | 487.7 | 497.3 | 524.4 | 488.8 | 456.7 | 438.1 | 437.0 |
| 37.5° | 1458.0 | 775.8 | 410.5 | 435.8 | 447.1 | 471.4 | 471.9 | 446.0 | 435.3 | 418.4 | 416.7 |
| 40° | 1433.2 | 699.1 | 394.7 | 424.6 | 425.7 | 448.2 | 411.0 | 418.4 | 416.1 | 403.1 | 401.4 |
| 42.5° | 1419.7 | 639.9 | 382.8 | 415.0 | 409.3 | 387.3 | 380.6 | 393.0 | 396.9 | 390.2 | 387.3 |
| 45° | 1409.0 | 593.7 | 373.2 | 381.7 | 396.4 | 356.3 | 353.5 | 363.1 | 371.6 | 371.0 | 368.7 |
| 47.5° | 1403.3 | 561.6 | 364.8 | 360.8 | 363.7 | 337.7 | 332.1 | 336.6 | 347.3 | 354.1 | 353.5 |
| 50° | 1381.4 | 536.8 | 352.4 | 339.4 | 321.4 | 321.4 | 318.6 | 318.6 | 331.5 | 345.1 | 346.2 |
| 52.5° | 1342.5 | 507.4 | 334.3 | 319.1 | 298.3 | 307.3 | 308.4 | 306.2 | 319.7 | 334.3 | 335.5 |
| 55° | 1299.6 | 485.4 | 310.1 | 300.5 | 279.1 | 294.3 | 299.4 | 297.1 | 306.2 | 316.3 | 315.7 |
| 57.5° | 1300.2 | 484.9 | 289.2 | 281.9 | 261.0 | 278.0 | 290.4 | 290.9 | 290.4 | 297.7 | 297.7 |
| 60° | *1332.9* | *496.2* | *272.9* | *257.1* | *240.2* | *260.5* | *280.8* | *280.8* | *276.8* | *287.5* | *288.7* |
| 62.5° | 1342.5 | 495.0 | 262.7 | 233.4 | 221.6 | 244.7 | 266.7 | 270.1 | 267.2 | 282.5 | 284.2 |
| 65° | 1257.9 | 468.5 | 252.6 | 212.0 | 204.7 | 227.2 | 249.2 | 258.8 | 256.0 | 275.7 | 278.0 |
| 67.5° | 1140.6 | 434.1 | 236.8 | 192.8 | 187.2 | 210.3 | 231.2 | 241.3 | 240.8 | 266.7 | 267.8 |
| 70° | 983.3 | 391.9 | 217.1 | 173.1 | 170.3 | 190.6 | 209.2 | 219.9 | 225.0 | 254.8 | 254.3 |
| 72.5° | 761.7 | 336.0 | 187.2 | 152.2 | 151.7 | 170.3 | 186.6 | 198.5 | 208.0 | 236.8 | 236.8 |
| 75° | 491.1 | 264.4 | 152.8 | 131.9 | 129.7 | 147.2 | 164.1 | 177.6 | 206.9 | 252.6 | 252.0 |
| 77.5° | 300.0 | 201.8 | 122.9 | 109.9 | 109.4 | 125.2 | 142.1 | 165.2 | 226.1 | 225.0 | 218.8 |
| 80° | 179.9 | 144.9 | 98.1 | 88.0 | 88.0 | 102.6 | 121.2 | 177.0 | 187.8 | 214.3 | 202.4 |
| 82.5° | 93.6 | 89.1 | 73.3 | 64.8 | 67.7 | 80.6 | 110.5 | 141.5 | 153.4 | 130.2 | 119.5 |
| 85° | 38.3 | 47.4 | 45.1 | 41.2 | 42.9 | 55.8 | 106.6 | 113.3 | 90.8 | 95.3 | 95.8 |
| 87.5° | 13.0 | 20.9 | 20.9 | 16.4 | 18.0 | 39.5 | 63.1 | 37.8 | 45.7 | 27.1 | 20.3 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-8

Luminaire Tested: CCW-SA-2A-840-U-SL4

Test Date: 04/27/2021

Report Generated By controller / USPTCWHP6086842

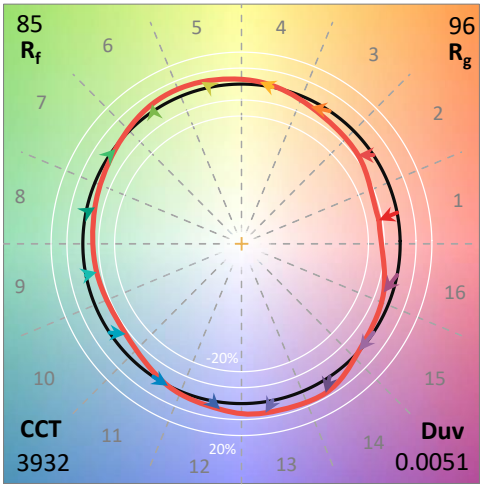
## Test Information

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | SP1-2104-224-8 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 |
| Measurement Geometry: | 4π |
| Issue Date: | 04/27/2021 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | **CCW-SA-2A-840-U-SL4** |
| Description: | INVUE WALL PACK ClearCurve Light Square |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3932 | CRI (Ra): | 81.8 | | |
| CIE u': | 0.2235 | R1: | 78.9 | R9: | 0.1 |
| CIE v': | 0.5092 | R2: | 86.4 | R10: | 69.8 |
| Duv: | 0.0051 | R3: | 94.7 | R11: | 82.4 |
| CIE x: | 0.3873 | R4: | 82.5 | R12: | 67.7 |
| CIE y: | 0.3923 | R5: | 79.9 | R13: | 80.2 |
| CIE z: | 0.2205 | R6: | 83.2 | R14: | 97.1 |
| Peak Wavelength (nm): | 590 | R7: | 86.3 | | |
| Dominant Wavelength (nm): | 576 | R8: | 62.5 | | |
| Purity: | 34 | | | | |

| | |
|---|---|
| Rf: | 85.2 |
| Rg: | 96.1 |




## Test Conditions

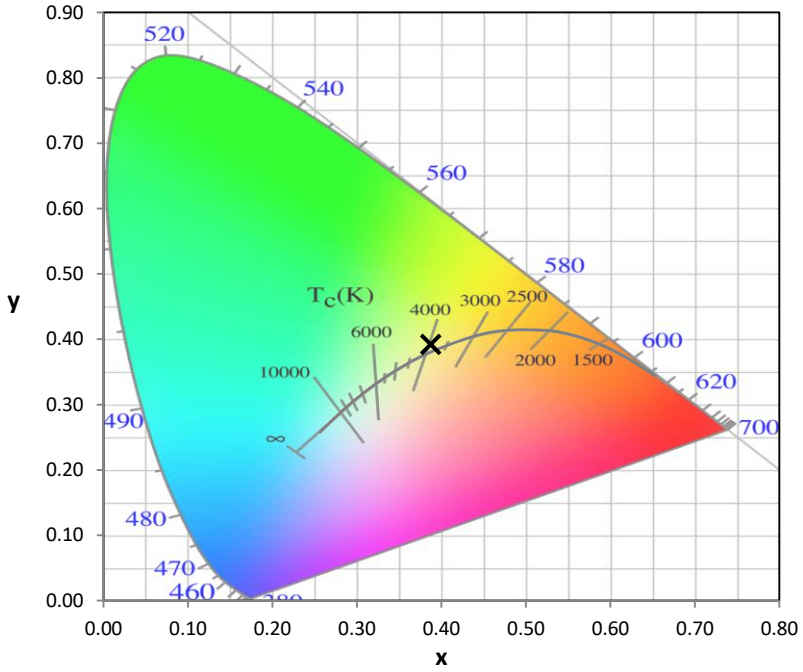
| | |
|---|---|
| Stabilization Time: | 123M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 24.9/41% |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2104-224-8

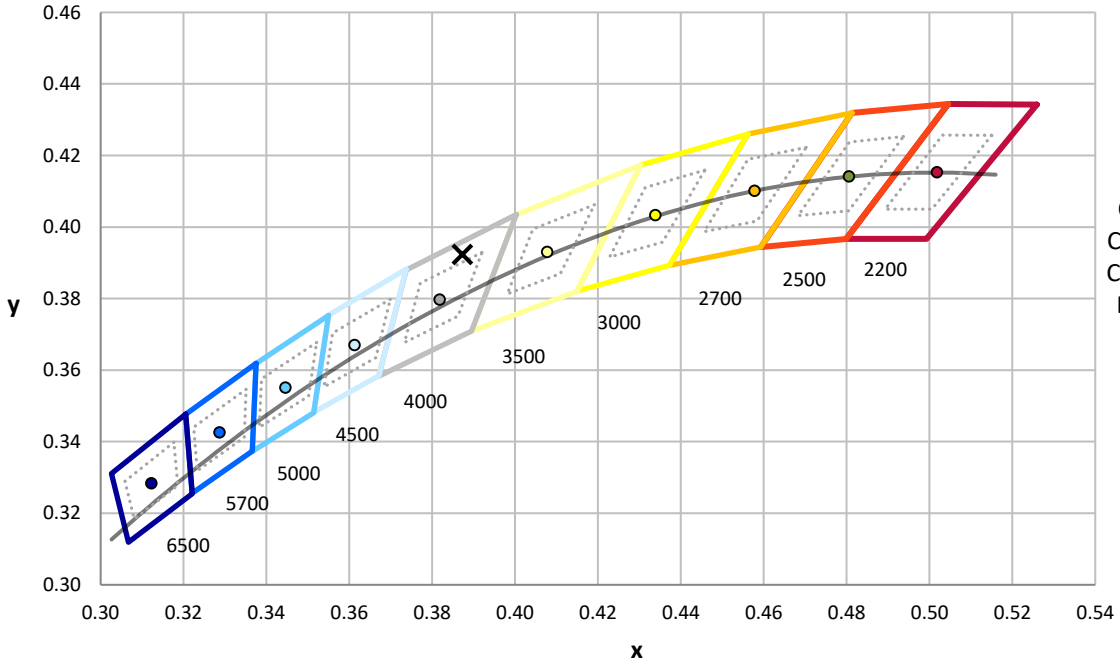
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 1/31/2021 | 7/31/2021 |
| Power Meter | IN0071 | 12/1/2020 | 12/1/2021 |
| AC Power Source | IN0063 | 12/1/2020 | 12/1/2021 |
| DC Power Source | IN0208 | 12/1/2020 | 12/1/2021 |
| Sphere Thermometer | IN0085 | 12/1/2020 | 12/1/2021 |
| Room Thermometer | IN0046 | 12/1/2020 | 12/1/2021 |

REPORT NUMBER: SP1-2104-224-8

## CIE 1931 Chromaticity Diagram




## CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles

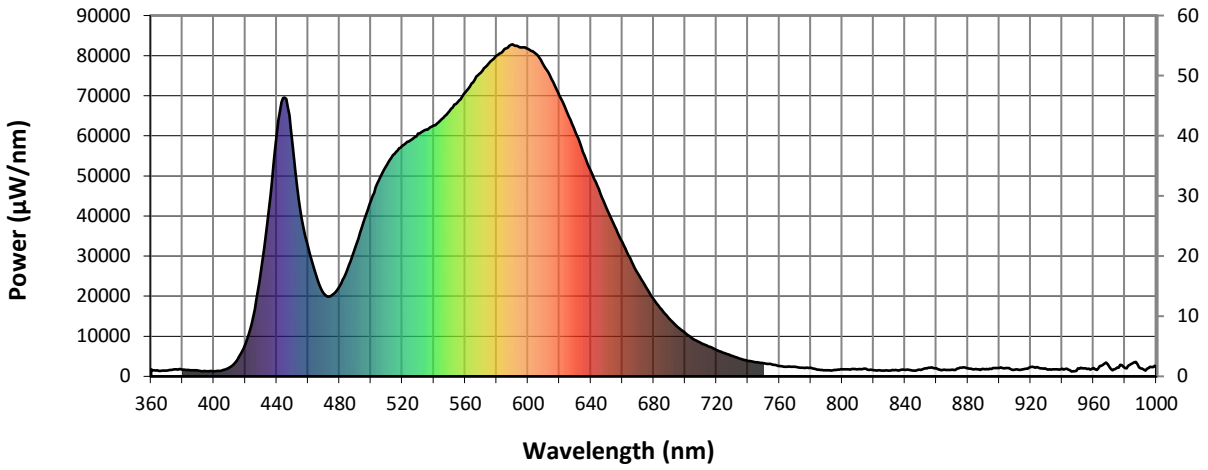



CCT = 3932K
CIE x = 0.3873
CIE y = 0.3923
Duv = 0.0051

Point lies inside the ANSI 4000K 7-step quadrangle

REPORT NUMBER: SP1-2104-224-8

## Photopic Flux vs. Wavelength

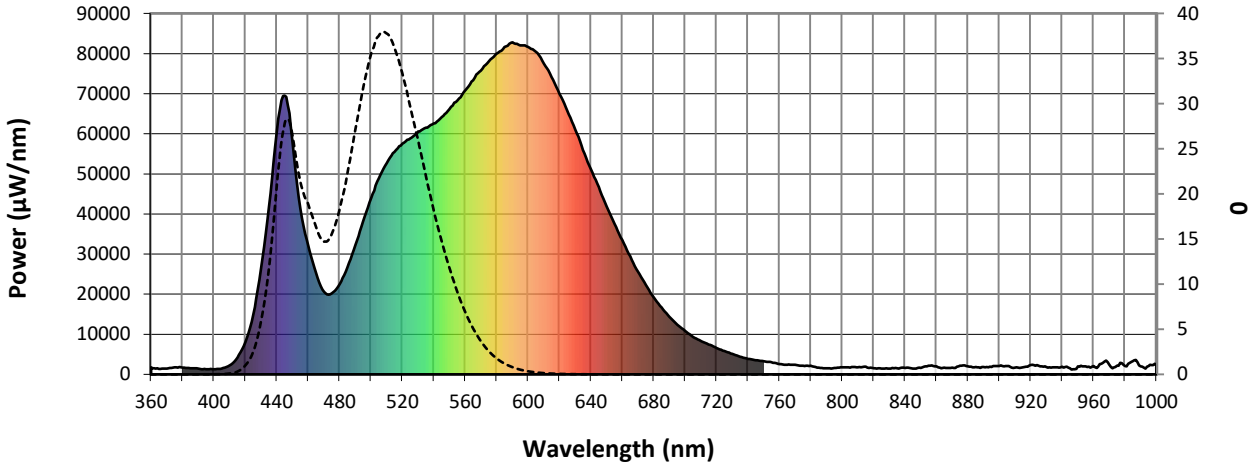



######

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 1725 | 0.0 | 490 | 32247 | 4.6 | 620 | 69956 | 18.2 | 750 | 3261 | 0.0 | 880 | 1960 | 0.0 |
| 365 | 1400 | 0.0 | 495 | 38143 | 6.9 | 625 | 65781 | 14.5 | 755 | 3018 | 0.0 | 885 | 1828 | 0.0 |
| 370 | 1447 | 0.0 | 500 | 43918 | 9.7 | 630 | 61092 | 11.1 | 760 | 2521 | 0.0 | 890 | 1806 | 0.0 |
| 375 | 1728 | 0.0 | 505 | 48833 | 13.7 | 635 | 55954 | 8.4 | 765 | 2437 | 0.0 | 895 | 1814 | 0.0 |
| 380 | 1669 | 0.0 | 510 | 52659 | 18.1 | 640 | 51151 | 6.1 | 770 | 2407 | 0.0 | 900 | 2078 | 0.0 |
| 385 | 1495 | 0.0 | 515 | 55510 | 23.0 | 645 | 46656 | 4.5 | 775 | 2143 | 0.0 | 905 | 2072 | 0.0 |
| 390 | 1437 | 0.0 | 520 | 57534 | 27.9 | 650 | 41933 | 3.1 | 780 | 2156 | 0.0 | 910 | 1650 | 0.0 |
| 395 | 1307 | 0.0 | 525 | 58806 | 31.6 | 655 | 37478 | 2.2 | 785 | 1708 | 0.0 | 915 | 1725 | 0.0 |
| 400 | 1277 | 0.0 | 530 | 60565 | 35.7 | 660 | 33501 | 1.4 | 790 | 1555 | 0.0 | 920 | 2324 | 0.0 |
| 405 | 1471 | 0.0 | 535 | 61554 | 38.2 | 665 | 29439 | 0.9 | 795 | 1560 | 0.0 | 925 | 2173 | 0.0 |
| 410 | 2252 | 0.0 | 540 | 62542 | 40.8 | 670 | 25594 | 0.6 | 800 | 1752 | 0.0 | 930 | 1833 | 0.0 |
| 415 | 4196 | 0.0 | 545 | 64150 | 42.7 | 675 | 22306 | 0.4 | 805 | 1696 | 0.0 | 935 | 1740 | 0.0 |
| 420 | 7969 | 0.0 | 550 | 66171 | 45.0 | 680 | 19204 | 0.2 | 810 | 1762 | 0.0 | 940 | 1956 | 0.0 |
| 425 | 14965 | 0.1 | 555 | 68352 | 46.7 | 685 | 16645 | 0.1 | 815 | 1884 | 0.0 | 945 | 1549 | 0.0 |
| 430 | 26348 | 0.2 | 560 | 70775 | 48.1 | 690 | 14365 | 0.1 | 820 | 1502 | 0.0 | 950 | 2026 | 0.0 |
| 435 | 41840 | 0.5 | 565 | 73374 | 48.8 | 695 | 12367 | 0.1 | 825 | 1454 | 0.0 | 955 | 1971 | 0.0 |
| 440 | 60229 | 0.9 | 570 | 75776 | 49.3 | 700 | 10847 | 0.0 | 830 | 1466 | 0.0 | 960 | 2048 | 0.0 |
| 445 | 69537 | 1.4 | 575 | 78035 | 48.6 | 705 | 9369 | 0.0 | 835 | 1541 | 0.0 | 965 | 2608 | 0.0 |
| 450 | 58253 | 1.5 | 580 | 79996 | 47.5 | 710 | 8303 | 0.0 | 840 | 1616 | 0.0 | 970 | 2403 | 0.0 |
| 455 | 41363 | 1.4 | 585 | 81672 | 45.4 | 715 | 7458 | 0.0 | 845 | 1445 | 0.0 | 975 | 2154 | 0.0 |
| 460 | 32336 | 1.3 | 590 | 82819 | 42.8 | 720 | 6565 | 0.0 | 850 | 1636 | 0.0 | 980 | 2109 | 0.0 |
| 465 | 25279 | 1.3 | 595 | 82030 | 38.9 | 725 | 5799 | 0.0 | 855 | 2149 | 0.0 | 985 | 3271 | 0.0 |
| 470 | 20560 | 1.3 | 600 | 81639 | 35.2 | 730 | 5071 | 0.0 | 860 | 2002 | 0.0 | 990 | 1987 | 0.0 |
| 475 | 20192 | 1.6 | 605 | 80430 | 31.1 | 735 | 4394 | 0.0 | 865 | 1653 | 0.0 | 995 | 2115 | 0.0 |
| 480 | 22473 | 2.1 | 610 | 77509 | 26.6 | 740 | 3856 | 0.0 | 870 | 1669 | 0.0 | 1000 | 2424 | 0.0 |
| 485 | 26686 | 3.2 | 615 | 74116 | 22.4 | 745 | 3544 | 0.0 | 875 | 2164 | 0.0 | | | |

REPORT NUMBER: SP1-2104-224-8

## Scotopic Flux vs. Wavelength

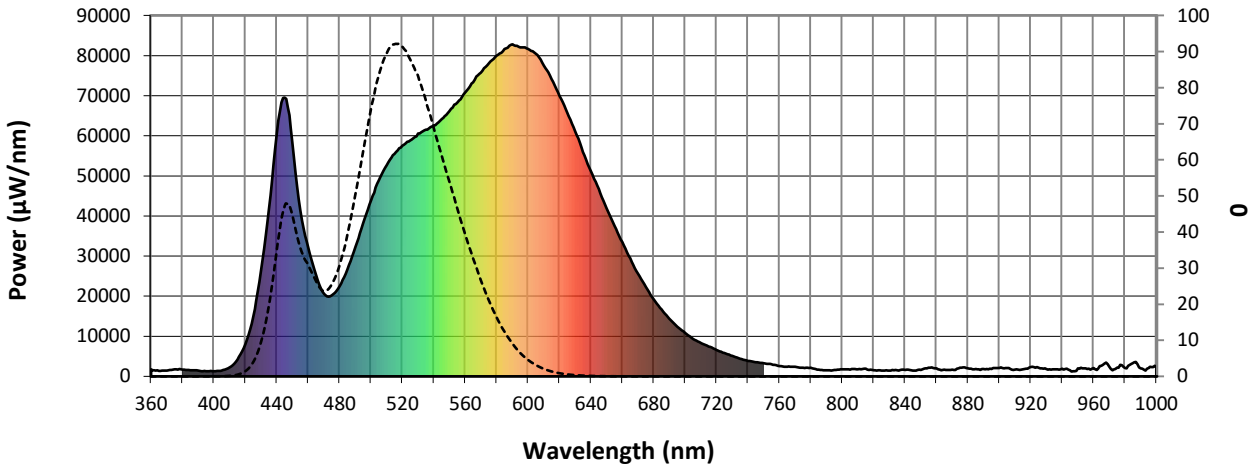



**Scotopic Lumens: 7846** **S/P: 1.64**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 1725 | 0.0 | 490 | 32247 | 49.7 | 620 | 69956 | 0.9 | 750 | 3261 | 0.0 | 880 | 1960 | 0.0 |
| 365 | 1400 | 0.0 | 495 | 38143 | 61.7 | 625 | 65781 | 0.6 | 755 | 3018 | 0.0 | 885 | 1828 | 0.0 |
| 370 | 1447 | 0.0 | 500 | 43918 | 73.5 | 630 | 61092 | 0.3 | 760 | 2521 | 0.0 | 890 | 1806 | 0.0 |
| 375 | 1728 | 0.0 | 505 | 48833 | 83.0 | 635 | 55954 | 0.2 | 765 | 2437 | 0.0 | 895 | 1814 | 0.0 |
| 380 | 1669 | 0.0 | 510 | 52659 | 89.3 | 640 | 51151 | 0.1 | 770 | 2407 | 0.0 | 900 | 2078 | 0.0 |
| 385 | 1495 | 0.0 | 515 | 55510 | 92.0 | 645 | 46656 | 0.1 | 775 | 2143 | 0.0 | 905 | 2072 | 0.0 |
| 390 | 1437 | 0.0 | 520 | 57534 | 91.5 | 650 | 41933 | 0.0 | 780 | 2156 | 0.0 | 910 | 1650 | 0.0 |
| 395 | 1307 | 0.0 | 525 | 58806 | 88.0 | 655 | 37478 | 0.0 | 785 | 1708 | 0.0 | 915 | 1725 | 0.0 |
| 400 | 1277 | 0.0 | 530 | 60565 | 83.5 | 660 | 33501 | 0.0 | 790 | 1555 | 0.0 | 920 | 2324 | 0.0 |
| 405 | 1471 | 0.0 | 535 | 61554 | 76.7 | 665 | 29439 | 0.0 | 795 | 1560 | 0.0 | 925 | 2173 | 0.0 |
| 410 | 2252 | 0.1 | 540 | 62542 | 69.1 | 670 | 25594 | 0.0 | 800 | 1752 | 0.0 | 930 | 1833 | 0.0 |
| 415 | 4196 | 0.4 | 545 | 64150 | 61.5 | 675 | 22306 | 0.0 | 805 | 1696 | 0.0 | 935 | 1740 | 0.0 |
| 420 | 7969 | 1.3 | 550 | 66171 | 54.1 | 680 | 19204 | 0.0 | 810 | 1762 | 0.0 | 940 | 1956 | 0.0 |
| 425 | 14965 | 3.7 | 555 | 68352 | 46.7 | 685 | 16645 | 0.0 | 815 | 1884 | 0.0 | 945 | 1549 | 0.0 |
| 430 | 26348 | 9.0 | 560 | 70775 | 39.6 | 690 | 14365 | 0.0 | 820 | 1502 | 0.0 | 950 | 2026 | 0.0 |
| 435 | 41840 | 18.7 | 565 | 73374 | 32.9 | 695 | 12367 | 0.0 | 825 | 1454 | 0.0 | 955 | 1971 | 0.0 |
| 440 | 60229 | 33.7 | 570 | 75776 | 26.7 | 700 | 10847 | 0.0 | 830 | 1466 | 0.0 | 960 | 2048 | 0.0 |
| 445 | 69537 | 46.6 | 575 | 78035 | 21.3 | 705 | 9369 | 0.0 | 835 | 1541 | 0.0 | 965 | 2608 | 0.0 |
| 450 | 58253 | 45.1 | 580 | 79996 | 16.5 | 710 | 8303 | 0.0 | 840 | 1616 | 0.0 | 970 | 2403 | 0.0 |
| 455 | 41363 | 36.1 | 585 | 81672 | 12.5 | 715 | 7458 | 0.0 | 845 | 1445 | 0.0 | 975 | 2154 | 0.0 |
| 460 | 32336 | 31.2 | 590 | 82819 | 9.2 | 720 | 6565 | 0.0 | 850 | 1636 | 0.0 | 980 | 2109 | 0.0 |
| 465 | 25279 | 26.7 | 595 | 82030 | 6.5 | 725 | 5799 | 0.0 | 855 | 2149 | 0.0 | 985 | 3271 | 0.0 |
| 470 | 20560 | 23.7 | 600 | 81639 | 4.6 | 730 | 5071 | 0.0 | 860 | 2002 | 0.0 | 990 | 1987 | 0.0 |
| 475 | 20192 | 25.2 | 605 | 80430 | 3.2 | 735 | 4394 | 0.0 | 865 | 1653 | 0.0 | 995 | 2115 | 0.0 |
| 480 | 22473 | 30.4 | 610 | 77509 | 2.1 | 740 | 3856 | 0.0 | 870 | 1669 | 0.0 | 1000 | 2424 | 0.0 |
| 485 | 26686 | 38.7 | 615 | 74116 | 1.4 | 745 | 3544 | 0.0 | 875 | 2164 | 0.0 | | | |

REPORT NUMBER: SP1-2104-224-8

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: 3084.4** **M/P: 0.64**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 1725 | 0.0 | 490 | 32247 | 26.8 | 620 | 69956 | 0.1 | 750 | 3261 | 0.0 | 880 | 1960 | 0.0 |
| 365 | 1400 | 0.0 | 495 | 38143 | 31.5 | 625 | 65781 | 0.0 | 755 | 3018 | 0.0 | 885 | 1828 | 0.0 |
| 370 | 1447 | 0.0 | 500 | 43918 | 35.3 | 630 | 61092 | 0.0 | 760 | 2521 | 0.0 | 890 | 1806 | 0.0 |
| 375 | 1728 | 0.0 | 505 | 48833 | 37.5 | 635 | 55954 | 0.0 | 765 | 2437 | 0.0 | 895 | 1814 | 0.0 |
| 380 | 1669 | 0.0 | 510 | 52659 | 37.8 | 640 | 51151 | 0.0 | 770 | 2407 | 0.0 | 900 | 2078 | 0.0 |
| 385 | 1495 | 0.0 | 515 | 55510 | 36.3 | 645 | 46656 | 0.0 | 775 | 2143 | 0.0 | 905 | 2072 | 0.0 |
| 390 | 1437 | 0.0 | 520 | 57534 | 33.5 | 650 | 41933 | 0.0 | 780 | 2156 | 0.0 | 910 | 1650 | 0.0 |
| 395 | 1307 | 0.0 | 525 | 58806 | 29.8 | 655 | 37478 | 0.0 | 785 | 1708 | 0.0 | 915 | 1725 | 0.0 |
| 400 | 1277 | 0.0 | 530 | 60565 | 26.2 | 660 | 33501 | 0.0 | 790 | 1555 | 0.0 | 920 | 2324 | 0.0 |
| 405 | 1471 | 0.0 | 535 | 61554 | 22.2 | 665 | 29439 | 0.0 | 795 | 1560 | 0.0 | 925 | 2173 | 0.0 |
| 410 | 2252 | 0.1 | 540 | 62542 | 18.3 | 670 | 25594 | 0.0 | 800 | 1752 | 0.0 | 930 | 1833 | 0.0 |
| 415 | 4196 | 0.3 | 545 | 64150 | 14.9 | 675 | 22306 | 0.0 | 805 | 1696 | 0.0 | 935 | 1740 | 0.0 |
| 420 | 7969 | 0.9 | 550 | 66171 | 11.9 | 680 | 19204 | 0.0 | 810 | 1762 | 0.0 | 940 | 1956 | 0.0 |
| 425 | 14965 | 2.3 | 555 | 68352 | 9.2 | 685 | 16645 | 0.0 | 815 | 1884 | 0.0 | 945 | 1549 | 0.0 |
| 430 | 26348 | 5.6 | 560 | 70775 | 7.0 | 690 | 14365 | 0.0 | 820 | 1502 | 0.0 | 950 | 2026 | 0.0 |
| 435 | 41840 | 11.2 | 565 | 73374 | 5.1 | 695 | 12367 | 0.0 | 825 | 1454 | 0.0 | 955 | 1971 | 0.0 |
| 440 | 60229 | 20.1 | 570 | 75776 | 3.7 | 700 | 10847 | 0.0 | 830 | 1466 | 0.0 | 960 | 2048 | 0.0 |
| 445 | 69537 | 27.4 | 575 | 78035 | 2.6 | 705 | 9369 | 0.0 | 835 | 1541 | 0.0 | 965 | 2608 | 0.0 |
| 450 | 58253 | 26.8 | 580 | 79996 | 1.8 | 710 | 8303 | 0.0 | 840 | 1616 | 0.0 | 970 | 2403 | 0.0 |
| 455 | 41363 | 21.7 | 585 | 81672 | 1.2 | 715 | 7458 | 0.0 | 845 | 1445 | 0.0 | 975 | 2154 | 0.0 |
| 460 | 32336 | 19.1 | 590 | 82819 | 0.8 | 720 | 6565 | 0.0 | 850 | 1636 | 0.0 | 980 | 2109 | 0.0 |
| 465 | 25279 | 16.5 | 595 | 82030 | 0.5 | 725 | 5799 | 0.0 | 855 | 2149 | 0.0 | 985 | 3271 | 0.0 |
| 470 | 20560 | 14.7 | 600 | 81639 | 0.3 | 730 | 5071 | 0.0 | 860 | 2002 | 0.0 | 990 | 1987 | 0.0 |
| 475 | 20192 | 15.4 | 605 | 80430 | 0.2 | 735 | 4394 | 0.0 | 865 | 1653 | 0.0 | 995 | 2115 | 0.0 |
| 480 | 22473 | 18.1 | 610 | 77509 | 0.1 | 740 | 3856 | 0.0 | 870 | 1669 | 0.0 | 1000 | 2424 | 0.0 |
| 485 | 26686 | 22.0 | 615 | 74116 | 0.1 | 745 | 3544 | 0.0 | 875 | 2164 | 0.0 | | | |

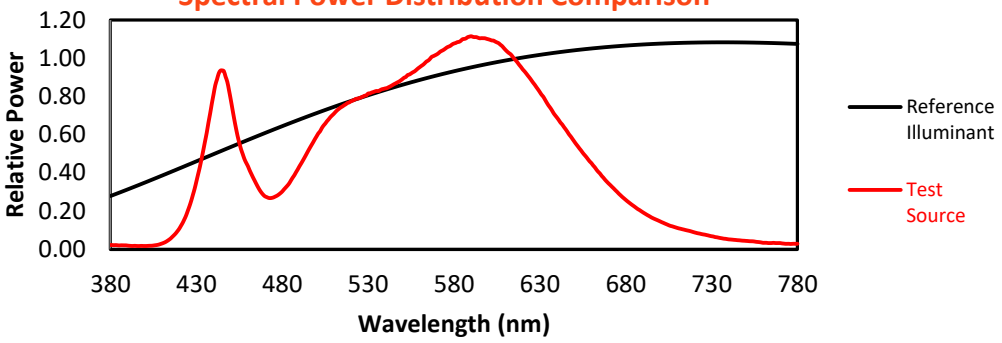
REPORT NUMBER: SP1-2104-224-8

# TM-30-18

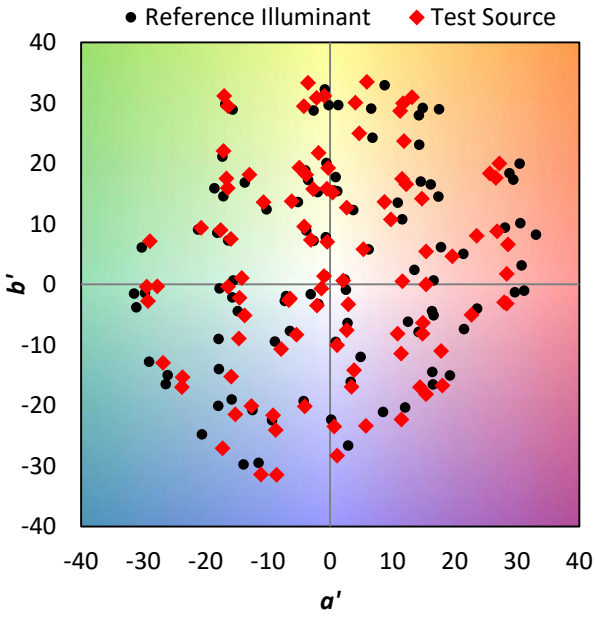
## Summary

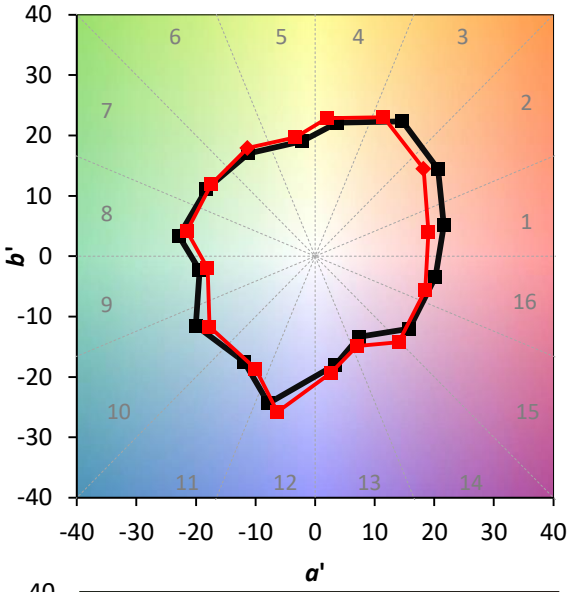
$R_f$ = 85.2
$R_g$ = 96.1
CIE $R_a$ = 81.8
$R_9$ = 0.1

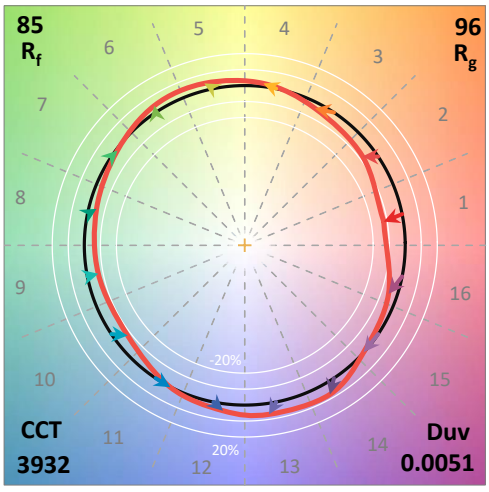
## Spectral Power Distribution Comparison

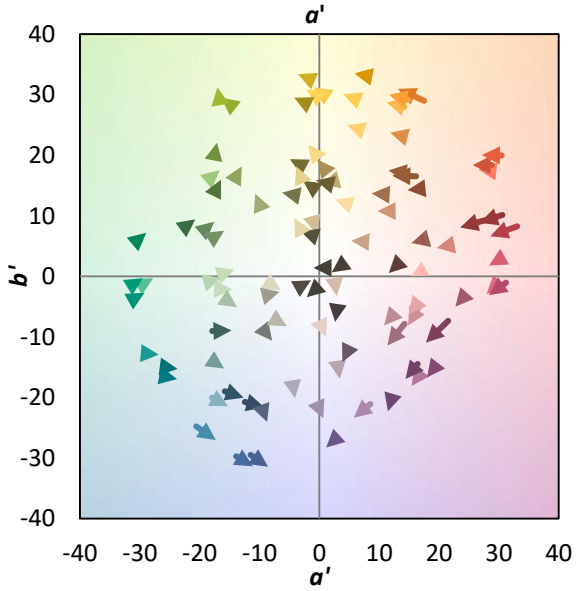



## Color Vector Graphics



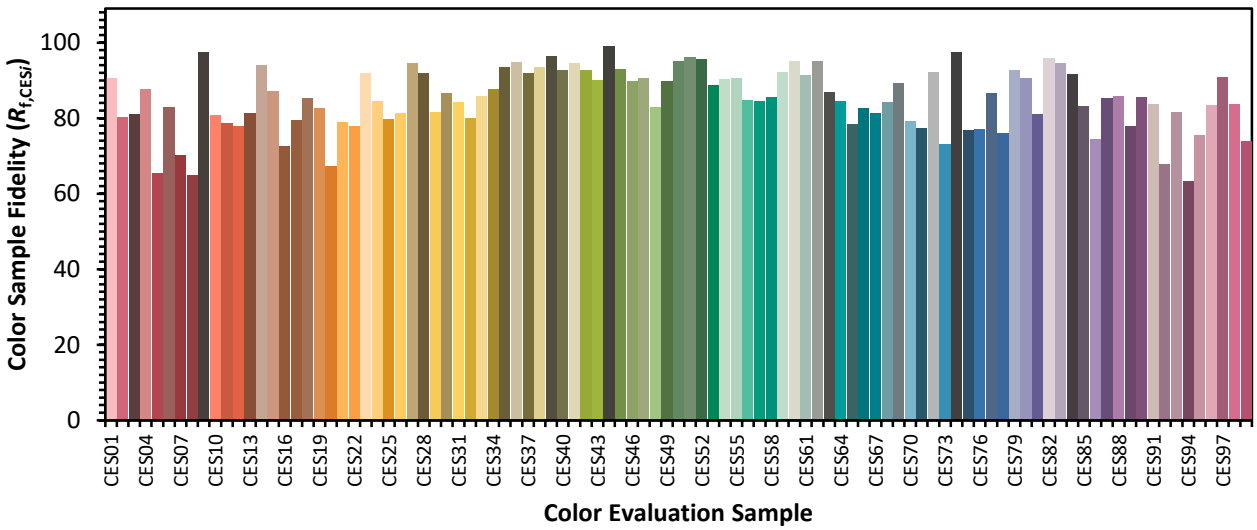



REPORT NUMBER: SP1-2104-224-8

# TM-30-18

**Individual Sample Fidelity Index ($R_{f,i}$)**

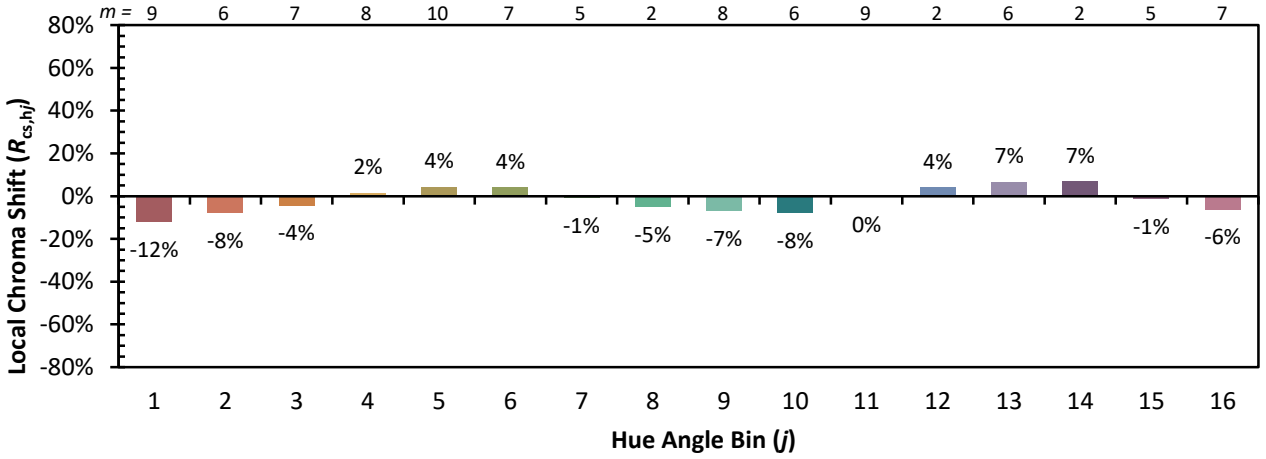
| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 81 | CES51 = 96 | CES76 = 77 |
| CES02 = 61 | CES27 = 95 | CES52 = 96 | CES77 = 87 |
| CES03 = 31 | CES28 = 92 | CES53 = 89 | CES78 = 76 |
| CES04 = 69 | CES29 = 82 | CES54 = 90 | CES79 = 93 |
| CES05 = 48 | CES30 = 87 | CES55 = 91 | CES80 = 91 |
| CES06 = 50 | CES31 = 84 | CES56 = 85 | CES81 = 81 |
| CES07 = 40 | CES32 = 80 | CES57 = 84 | CES82 = 96 |
| CES08 = 39 | CES33 = 86 | CES58 = 85 | CES83 = 95 |
| CES09 = 29 | CES34 = 88 | CES59 = 92 | CES84 = 92 |
| CES10 = 74 | CES35 = 93 | CES60 = 95 | CES85 = 83 |
| CES11 = 57 | CES36 = 95 | CES61 = 91 | CES86 = 74 |
| CES12 = 63 | CES37 = 92 | CES62 = 95 | CES87 = 85 |
| CES13 = 42 | CES38 = 93 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 96 | CES64 = 84 | CES89 = 78 |
| CES15 = 71 | CES40 = 93 | CES65 = 78 | CES90 = 85 |
| CES16 = 47 | CES41 = 95 | CES66 = 83 | CES91 = 84 |
| CES17 = 49 | CES42 = 93 | CES67 = 81 | CES92 = 68 |
| CES18 = 56 | CES43 = 90 | CES68 = 84 | CES93 = 82 |
| CES19 = 71 | CES44 = 99 | CES69 = 89 | CES94 = 63 |
| CES20 = 65 | CES45 = 93 | CES70 = 79 | CES95 = 75 |
| CES21 = 86 | CES46 = 90 | CES71 = 77 | CES96 = 83 |
| CES22 = 78 | CES47 = 91 | CES72 = 92 | CES97 = 91 |
| CES23 = 91 | CES48 = 83 | CES73 = 73 | CES98 = 84 |
| CES24 = 90 | CES49 = 90 | CES74 = 98 | CES99 = 74 |
| CES25 = 71 | CES50 = 95 | CES75 = 77 | |

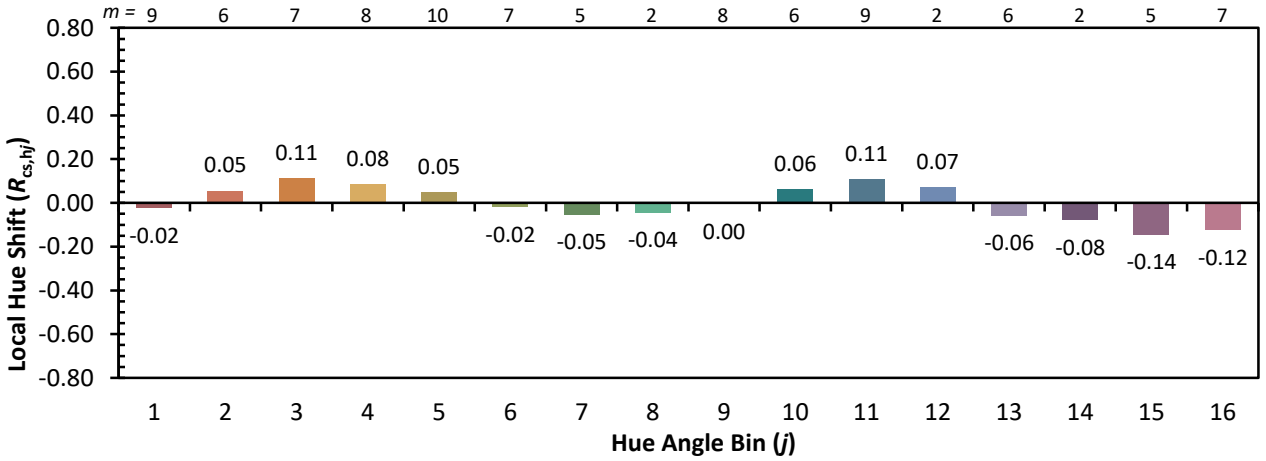


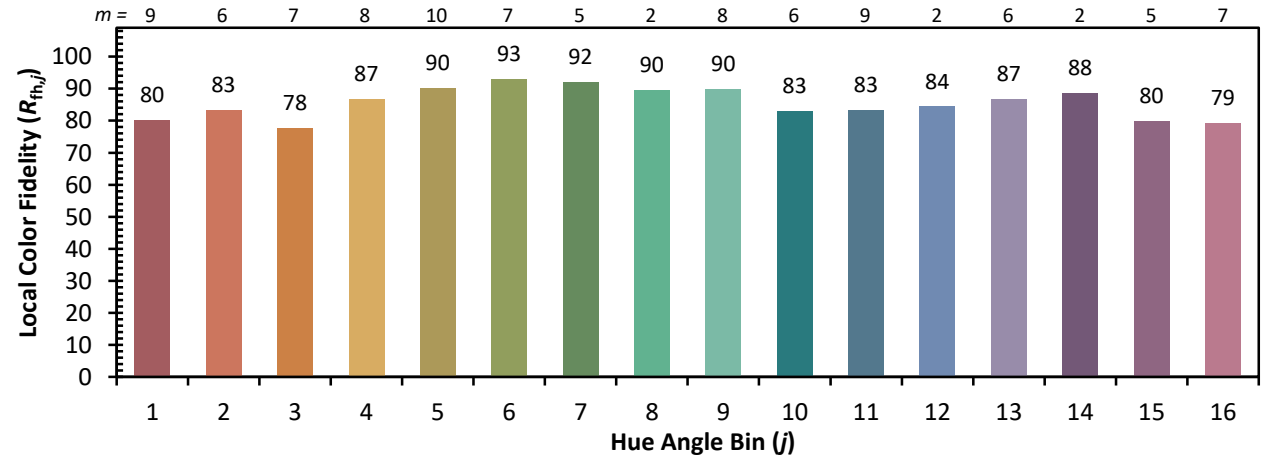
REPORT NUMBER: SP1-2104-224-8

**TM-30-18**

## Color Rendition by Hue-Angle Bin



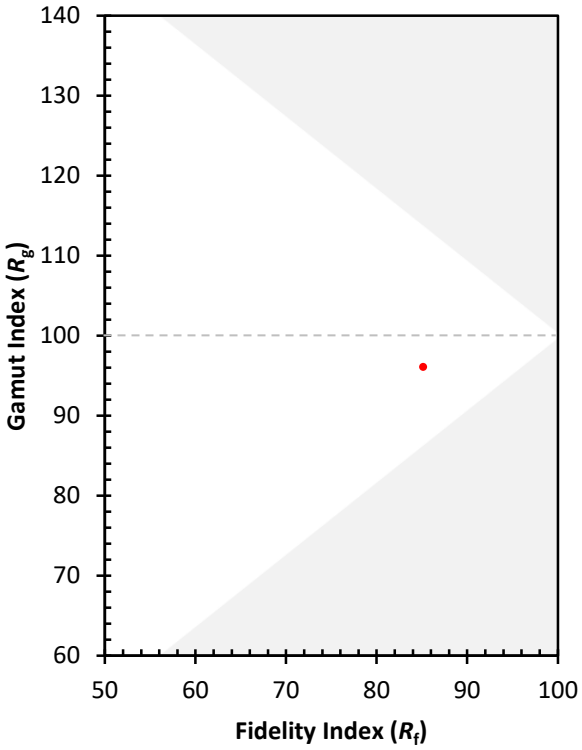



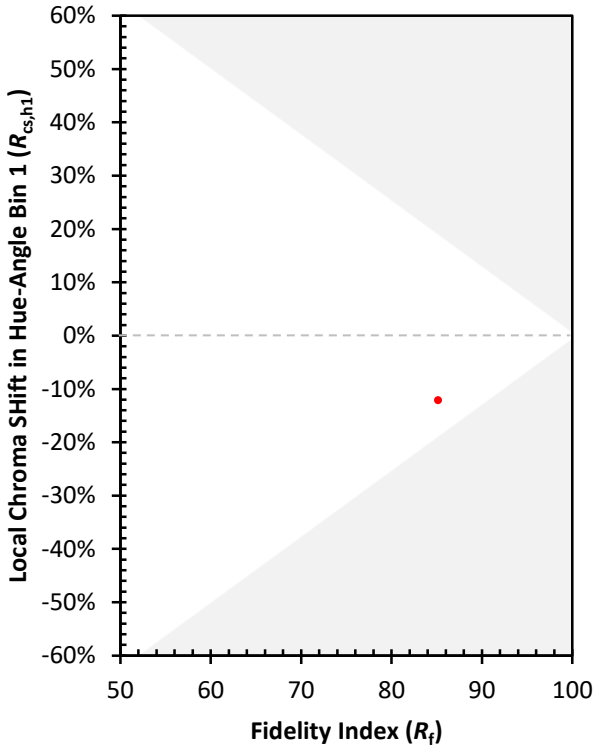



REPORT NUMBER: SP1-2104-224-8

## TM-30-18

### Measure Comparisons




(END OF REPORT)